

THAT WHICH IS CLAIMED:

1. An isolated nucleic acid molecule having a nucleotide sequence selected from the group consisting of:

- 5 (a) a nucleotide sequence encoding a polypeptide comprising the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;
- (b) a nucleotide sequence comprising the sequence set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23;
- 10 (c) a nucleotide sequence encoding a polypeptide having at least 80% sequence identity to the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27, wherein said polypeptide retains pesticidal activity;
- (d) a nucleotide sequence encoding a polypeptide comprising at least 10 contiguous amino acids of the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;
- 15 (e) a nucleotide sequence comprising at least 30 contiguous nucleotides of the nucleotide sequences set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23; and
- (f) a nucleotide sequence consisting of a complement of the nucleotide sequence in (a), (b), (c), (d), (e), or a complement thereof, wherein said
- 20 sequence encodes a polypeptide having pesticidal activity.

2. An expression cassette comprising a nucleic acid molecule of claim 1, wherein said nucleotide sequence is operably linked to a promoter.

25 3. The expression cassette of claim 2, wherein said promoter is selected from the group consisting of constitutive, inducible, and tissue-preferred promoters.

4. The expression cassette of claim 2, wherein said promoter is a vascular tissue-preferred promoter.

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5. A host cell expressing a polypeptide encoded by any one of the nucleic acid molecules of claim 1.

6. The host cell of claim 5, wherein the host cell is selected from the group consisting of fungi, yeast, plant, mammal, and insect cells.

7. A virus comprising an isolated nucleic acid of claim 1.

8. An isolated polypeptide comprising an amino acid sequence selected from the group consisting of:

(a) an amino acid sequence encoded by a nucleotide sequence set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23;

(b) an amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;

(c) an amino acid sequence having at least 80% sequence identity to the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27, or a fragment thereof, wherein said polypeptide retains pesticidal activity; and

(d) an amino acid sequence consisting of at least 10 contiguous amino acids of the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27.

9. The isolated polypeptide of claim 8, wherein the polypeptide is orally active.

10. A composition comprising the isolated polypeptide of claim 8.

11. A recombinant baculovirus expression vector comprising a nucleotide sequence encoding a polypeptide having an amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27.

12. A recombinant baculovirus expression vector comprising a nucleotide sequence encoding a polypeptide consisting of at least 10 contiguous amino acids of SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27.

5 13. A transformed plant comprising in its genome at least one stably incorporated expression cassette comprising a nucleotide sequence operably linked to a promoter that drives expression in a plant cell, wherein said nucleotide sequence is selected from the group consisting of:

(a) a nucleotide sequence encoding a polypeptide comprising the  
10 amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;

(b) a nucleotide sequence comprising the sequence set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23;

(c) a nucleotide sequence encoding a polypeptide having at least 80% sequence identity to the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22,  
15 24, or 27, wherein said polypeptide retains pesticidal activity;

(d) a nucleotide sequence encoding a polypeptide comprising at least 10 contiguous amino acids of the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;

(e) a nucleotide sequence comprising at least 30 contiguous  
20 nucleotides of the nucleotide sequences set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23; and

(f) a nucleotide sequence consisting of a complement of the nucleotide sequence in (a), (b), (c), (d), (e), or a complement thereof, wherein said sequence encodes a polypeptide having pesticidal activity.

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14. The transformed plant of claim 13, wherein said promoter is selected from the group consisting of constitutive, inducible, and tissue-preferred promoters.

15. The transformed plant of claim 13, wherein said promoter is a vascular  
30 tissue-preferred promoter.

16. The transformed plant of claim 13, wherein said promoter is an insect-inducible promoter.

17. The transformed plant of claim 13, wherein said plant is a crop plant  
5 selected from the group consisting of maize, wheat, sorghum, rice, barley, soybean, alfalfa, sunflower, *Brassica*, and tomato.

18. The transformed plant of claim 17, wherein said crop plant is rice.

10 19. Transformed seed of the plant of claim 13.

20. The transformed plant of claim 13, wherein said promoter is a vascular tissue-preferred promoter, said plant is rice, and said nucleotide sequence encodes the polypeptide set forth in SEQ ID NO:20 (Aam1).

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21. The plant of claim 13, wherein said plant exhibits altered insect resistance.

22. The plant of claim 21, wherein said insect resistance is impacting insects selected from the group consisting of Homopteran, Hymenopteran, and Lepidopteran  
20 species.

23. A method for altering plant pest resistance, said method comprising stably transforming into a plant cell a nucleotide sequence operably linked to a promoter that drives expression in said plant cell, wherein said nucleotide sequence comprises a  
25 nucleotide sequence selected from the group consisting of:

(a) a nucleotide sequence encoding a polypeptide comprising the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;

(b) a nucleotide sequence comprising the sequence set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23;

(c) a nucleotide sequence encoding a polypeptide having at least 80% sequence identity to the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27, wherein said polypeptide retains pesticidal activity;

(d) a nucleotide sequence encoding a polypeptide comprising at least  
5 10 contiguous amino acids of the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20, 22, 24, or 27;

(e) a nucleotide sequence comprising at least 30 contiguous nucleotides of the nucleotide sequences set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23; and

10 (f) a nucleotide sequence consisting of a complement of the nucleotide sequence in (a), (b), (c), (d), (e), or a complement thereof, wherein said sequence encodes a polypeptide having pesticidal activity.

24. The method of claim 23, wherein said promoter is selected from the group  
15 consisting of constitutive, inducible, and tissue-preferred promoters.

25. The method of claim 23, wherein said promoter is a vascular tissue-preferred promoter.

20 26. The method of claim 23, wherein said promoter is an insect-inducible promoter.

27. The method of claim 23, wherein said pest resistance is insect resistance.

25 28. The method of claim 23, wherein said promoter is a vascular tissue preferred promoter, said plant is rice, said nucleotide sequence is SEQ ID NO:20 (Aam1), and said plant possesses altered insect resistance to both Homopteran and Lepidopteran species of insects.

30 29. The method of claim 28, wherein said Lepidopteran species of insect is resistant to a Bt toxin.

30. The method of claim 23, wherein said plant is a crop plant selected from the group consisting of maize, wheat, sorghum, rice, barley, soybean, alfalfa, sunflower, *Brassica*, and tomato.

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31. The method of claim 27, wherein said insect resistance impacts insects selected from the group consisting of Homoptera, Lepidoptera, and Hymenoptera.

32. A method of identifying a polypeptide that when expressed in a plant  
10 possesses oral pesticidal activity, said method comprising the steps of:  
    (a) isolating said polypeptide from arthropod venom;  
    (b) assaying said polypeptide for oral insecticidal activity;  
    (c) determining the amino acid sequence of said polypeptide;  
    (d) generating a nucleotide sequence that encodes said polypeptide;  
15      (e) transforming a plant with at least one stably incorporated  
expression cassette comprising said nucleotide sequence encoding said polypeptide  
operably linked to a promoter that drives expression in said plant; and  
    (f) measuring said oral pesticidal activity of said polypeptide when  
expressed in said plant.

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33. The method of claim 32, wherein said venom is obtained from isolated venom glands.

34. A method for screening arthropod venom polypeptides for oral pesticidal  
25 activity, said method comprising:  
    (a) isolating polypeptides from arthropod venom;  
    (b) generating a polypeptide solution comprising said isolated  
polypeptides and a nutrient;  
    (c) feeding said polypeptide solution to a pest; and  
30      (d) assaying for pesticidal activity.

35. The method of claim 34, wherein said pests are selected from the group consisting of the Homopteran and Lepidopteran orders of insect.

36. The method of claim 34, wherein said pesticidal activity is selected from  
5 the group comprising mortality, weight loss, attraction, and repellency.

37. An antibody that selectively binds to an isolated polypeptide comprising an amino acid sequence selected from the group consisting of:

(a) the amino acid sequence set forth in SEQ ID NO:2, 4, 7, 10, 20,  
10 22, 24, or 27; and

(b) the amino acid sequence encoded by a nucleotide sequence set forth in SEQ ID NO:1, 3, 6, 8, 9, 11, 21, or 23.